MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The REVIEW for January, 1896, is based on reports from 2,737 stations occupied by regular and voluntary observers, classified as follows: 149 from Weather Bureau stations; 35 from U. S. Army post surgeons; 2,395 from voluntary observers; 32 from Canadian stations; 96 received through the Southern Pacific Railway Company; 30 from U. S. Life-Saving stations; international simultaneous observations are received from a few stations and used together with trustworthy newspaper extracts and special reports.

The WEATHER REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe. Unless otherwise specifically noted, the text is written by the Editor, but the statistical tables are furnished by Mr. A. J. Henry, Chief of the Division of Records and Meteorological Data. Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada, and of Dr. Mariano Bárcena, Director of the Central Meteorological Observatory of Mexico.

CLIMATOLOGY OF THE MONTH.

GENERAL CHARACTERISTICS.

During the current month the average pressure showed a notable deficit on the coasts of Oregon and Washington. The average temperature was generally above the normal. Precipitation was below the normal, except on the Pacific coast.

ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers, not reduced to standard gravity, and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), is shown by isobars on Chart IV. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border.

The *mean pressures* during the current month were high in the Middle and South Atlantic States, and also in the Dakotas and Saskatchewan. The highest were: Prince Albert and Bismarck, 30.25; Salt Lake City, 30.24; Winnipeg, 30 23; Battleford, St. Vincent, Moorhead, Idaho Falls, Cincinnati, Northfield, Washington, Harrisburg, Parkersburg, Lynchburg, Raleigh, Charleston, Atlanta, Knoxville, and Chattanooga, 30.22.

The *mean pressures* were low in Washington and Newfoundland. The lowest were: Tatoosh Island, 29.81; Esquimault, 29.84; St. Johns, N. F., 29.85; Astoria, 29.88.

As compared with the normal for January the mean pressure was in excess in New England, Quebec, and Ontario, but deficient in Washington and Oregon. The greatest excesses were: Father Point and Northfield, 0.15; Quebec, 0.13; Rockliffe, Montreal, Halifax, and Albany, 0.12; Eastport and Sault Ste. Marie, 0.11; Boston, Kingston, and Harrisburg, 0.10.

The greatest deficits were: Tatoosh Island, 0.21; Roseburg, 0.19; Baker City and Portland, Oreg., 0.15; Walla Walla, 0.14; Port Angeles, 0.13; Eureka, 0.12.

As compared with the preceding month of December the pressures reduced to sea level show a decided rise in the interior valley of the continent, but a fall on the Pacific Coast. The greatest rises were: Battleford, Prince Albert, and Swift Current, 0.35; Minnedosa and Winnipeg, 0.34; Edmonton, 0.33; Qu'Appelle and St. Vincent, 0.31. The greatest falls were: Eureka, 0.24; Roseburg, 0.21; Red Bluff, 0.20; Winnemucca and Sacramento, 0.17; San Francisco and Portland, Oreg., 0.16; Astoria, Carson City, and Fresno, 0.15.

AREAS OF HIGH AND LOW PRESSURE.

By Prof. H. A. HAZEN.

During January there have been eleven areas of high pressure and ten of low pressure, mapped on Charts I and II. One of the high areas, No. IV, was central in the middle Plateau Region for 5 days, but had no motion, and hence does not enter the calculations in the table, as also low area VIII, which was noted for only twenty-four hours. The accompanying table gives some of the general points regarding these highs and lows, and the following is a brief description of these conditions:

HIGH AREAS.

I.—First noted in the west Gulf a. m. of 1st. Its motion was eastward, reaching and disappearing in the Atlantic a. m. of 3d.

II.—First noted to the north of Montana a. m. of 1st. It rapidly developed in forty-eight hours, a pressure of 31.20 being reported from Calgary a. m. of 3d. Its motion was along the northern border, reaching the mouth of the St. Lawrence p. m. of 10th. The severest cold wave of the month accompanied this high, and a special cold wave bulletin, No. 1, was issued. A fall in temperature of 46° in twenty-four hours occurred at Havre p. m. of 1st, and at Bismarck p. m. of 2d.

III.—On the p. m. of 3d high area II extended in a long ridge of high pressure from Manitoba to the west Gulf, and III was first noted as a separate high in the south of this ridge. Its motion was south, and disappeared in the central Gulf p. m. of 6th.

IV.—This was an intensification of the rather permanent high area in the Plateau Region, and had no motion.

V.—First noted p. m. of 10th on the north Pacific Coast. This was the only high that originated so far west. Its motion was southeast, and it was last noted in the central Mississippi Valley, p. m. of 12th.

VI.—First noted to the north of Montana a. m. of 13th. Its motion was east at first, then southeast, and finally northeast, disappearing in the Gulf of St. Lawrence p. m. of 20th.

VII.—First noted to the north of Montana p. m. of 16th. Its motion was generally southeast, and it disappeared in the Ohio Valley p. m. of 19th.

VIII.—First noted in Manitoba a. m. of 20th. Its motion was along the northern border of the country, and it disappeared over Newfoundland a. m. of 26th.

IX.—First noted a. m. of 21st to the north of Montana. Its motion was beyond the region of observation, and was last noted in Manitoba a. m. of 24th.

X.—First noted p. m. of 23d to the north of Montana. Its motion was southeast and east, and it disappeared off the middle Atlantic coast a. m. of 30th.

XI.—First noted to the north of Montana a. m. of 28th. Its motion was eastward, and it was last noted in Maine p. m. of 31st.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	1, a. m.	29	88	3, a. m.	28	82	800	2.0	399	16.6
II	1, a. m.	50	115	10, p. m.	50	68	3,280	9.5	345	14.4
III	3, p. m.	39	97	6, a. m.	31	84	1,380	2.5	552	23.0
IV*										
V	10, p. m.	49	124	12, p. m.	39	91	1,860	2.0	930	38.8
VI	13, a. m.	52	113	20, p. m.	50	64	3,280	7.5	440	18.3
VII	16, p. m.	52	115	19, p. m.	39	86	2,180	3.0	726	30.2
VIII	20, a. m.	53	103	26, a. m.	52	68	2,740	6.0	456	19.0
IX	21, a. m.	53	116	24, a. m.	54	100	980	3.0	327	13.6
X	23, p. m.	55	118	30, a. m.	36	79	2,980	6.5	458	19.1
XI	28, a. m.	52	119	31, p. m.	48	69	2,400	3.5	684	28.5
Sums							21,880	45.5	5,317	
Mean of 10 paths									532	22.2
Mean of 45.5 days									481	20.0
Low areas.										
I	1, a. m.	50	100	3, p. m.	46	57	2,050	2.5	818	34.1
II	4, a. m.	48	128	10, a. m.	27	79	3,680	6.0	613	25.5
III	6, p. m.	53	118	10, a. m.	41	71	2,420	3.5	692	28.8
IV	8, p. m.	53	116	14, p. m.	46	58	3,500	5.5	636	26.5
V	14, p. m.	42	126	20, p. m.	49	81	2,770	6.0	462	19.3
VI	15, a. m.	27	96	18, a. m.	38	71	1,650	3.0	550	22.9
VII	17, a. m.	42	107	19, p. m.	36	73	2,010	2.5	804	33.5
VIII	19, p. m.	50	128	20, p. m.	51	111	†	†	†	†
IX	20, p. m.	31	99	25, p. m.	48	77	1,540	5.0	308	12.8
X	24, p. m.	44	126	28, p. m.	48	90	2,210	4.0	552	23.0
Sums							21,830	38.0	5,435	
Mean of 9 paths									604	25.7
Mean of 38 days									574	23.9

*Stationary in middle Plateau for 5 days. †Too short path.

LOW AREAS.

I.—First noted a. m. of 1st in Manitoba. Its motion was eastward along the north border of United States, and disappeared over Newfoundland p. m. of 3d.

II.—First noted off the north Pacific Coast a. m. of 4th. Its motion was east and southeast, and it disappeared off the Florida coast a. m. of 10th.

III.—First noted to the north of Montana p. m. of 6th. Its motion was eastward, and it disappeared off the Massachusetts coast a. m. of 10th.

IV.—First noted to the north of Montana p. m. of 8th. Its motion was eastward, and it disappeared over Newfoundland p. m. of 14th.

V.—For twenty-four hours on 14th a disturbance had been noted off the north Pacific Coast, but its definite progress upon the land began p. m. of 14th. Its motion was very slow for several days, and then more rapid to the eastward. It was last noted to the north of Lake Erie p. m. of 20th.

VI.—This storm began in the west Gulf a. m. of 15th. Its motion eastward brought it to the Florida coast p. m. of 16th; thence it moved along the Atlantic Coast, and it disappeared off the middle Atlantic Coast a. m. of 18th.

VII.—First noted in Colorado a. m. of 17th. Its motion was rapid toward the east, and it was last noted off the middle Atlantic Coast p. m. of 19th.

VIII.—First noted off the north Pacific Coast p. m. of 19th. It had a slight eastward motion for twenty-four hours, but rapidly filled up to the north of Montana.

IX.—First noted p. m. of 20th in south Texas. Its motion was northeast, and was last noted in the St. Lawrence Valley p. m. of 25th. More general rain or snow accompanied this storm than any other of the month.

X.—First noted p. m. of 24th off the north Pacific Coast. Its motion was eastward, and it was last noted over Lake Superior p. m. of 28th.

TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The mean temperature is given for each station in Table II, for voluntary observers. Both the mean temperatures and the departures from the normal are given in Table I for the regular stations of the Weather Bureau.

The *monthly mean temperatures* published in Table I, for the regular stations of the Weather Bureau, are the simple means of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

The *regular diurnal period* in temperature is shown by the hourly means given in Table V for 29 stations selected out of 82 that maintain continuous thermograph records.

The *distribution* of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart IV; the lines are drawn over the high irregular surface of the Rocky Mountain Plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *highest mean* temperatures were: Key West, 66.4; Jupiter, 62.3; Yuma, 57.8; Tampa, 57.2; Corpus Christi, 56.7. The lowest mean temperatures were, in the United States: St. Vincent, —20; and in Canada: Prince Albert, —11.0; Battleford, —9.3; Edmonton and Winnipeg, —4.5; Minnedosa, —4.0; Qu'Appelle, —2.9.

As *compared with the normal* for January, the mean temperatures for the current month were above the normal in all regions except the Atlantic Coast States where they were below.

The greatest excesses were: North Platte, 13.2; Dodge City, 12.8; Huron, 11.8; Concordia, 11.1; Denver, 10.7; Idaho Falls and Pierre, 10.5; Omaha, 10.1. The greatest deficits were; Edmonton, 5.7; Jupiter, 4.7; Vineyard Haven, 4.6; Key West, 4.0.

Considered by districts the mean temperatures for the current month show departures from the normal as given in Table I. The greatest positive departure was: Middle Slope, 9.8. The greatest negative departures: Florida Peninsula, 3.5; South Atlantic, 2.5.

The years of highest and lowest mean temperatures for January, are shown in Table I of the REVIEW for January, 1894. The mean temperature for the current month was the highest on record at: Concordia, 32.5; Topeka, 32.4; Wichita, 35.7;